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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/737,319	12/14/2000	Satoru Toguchi	1558-14	9502

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Chicago, IL 60611

EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 03/18/2002

2

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/737,319

Applicant(s)
Satoru TOGUCHI et al.

Examiner
M. Yamnitzky

Art Unit
1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three (3) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Dec 14, 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

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1. The disclosure is objected to because of the following informalities:

Several of the chemical names set forth in lines 12-17 include the symbol "□". It is not clear what this symbol means.

Appropriate correction is required.

2. Claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 7 recite "one or more organic thin-film layers" and then recite "the organic thin-film layers including". In a device comprising more than one organic thin-film layer, it is not clear if each organic thin-film layer according to claim 1 and dependents must include a perylene compound of formula [1], or if it is sufficient for at least one organic thin-film layer to include the perylene compound when there are multiple organic thin-film layers. Similarly, it is not clear if each organic thin-film layer according to claim 7 and dependents must include a benzoperylene compound of formula [2].

The limitations regarding the group with steric hindrance are not clear. Claim 1 requires at least one diarylamino group, and encompasses compounds comprising more than one diarylamino group. Claim 1 recites "at least one of R¹ to R¹² other than the diarylamino group is a group with steric hindrance". It is not clear if, in compounds in which more than one of R¹ to R¹² is a diarylamino group, only one diarylamino group is excluded from representing the group with

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steric hindrance. In other words, would a compound of formula [1] in which two of R^1 to R^{12} represent diarylamino groups and the remainder of R^1 to R^{12} represent hydrogen be within the scope of the claim with one diarylamino group being "the diarylamino group" and the second diarylamino group meeting the limitations of the group with steric hindrance? Similarly, it is not clear if only one diarylamino group according to claim 8 is excluded from being the group with steric hindrance.

Given that claims 1 and 8 define Ar^1 and Ar^2 as representing "non-substituted aromatic hydrocarbon group or substituted or non-substituted aromatic heterocyclic group", it also is not clear if a diarylamino group of formula $-NAr^1Ar^2$ in which each of Ar^1 and Ar^2 represents a substituted aromatic hydrocarbon group could be used as a group with steric hindrance since such a group is not explicitly within the scope of the diarylamino group defined in claims 1 and 8.

The limitations regarding the group with steric hindrance are also rendered indefinite by the recitation in claims 1 and 7 of "for suppressing aggregation of molecules". It is not clear if this requires no aggregation, or if some unspecified amount of aggregation may occur. It is not clear how much aggregation must be suppressed in order to meet the limitations of the claims.

Claim 2: Antecedent basis is lacking for " A^1 ". " A^1 " should apparently read $--Ar^1--$.

Clarification is required as to whether claims 2 and 9 are limiting at least one of Ar^1 and Ar^2 to an aromatic heterocyclic group. This is questioned because claims 2 and 9 require a styryl group as a "substituent" but claims 1 and 8 only explicitly allow Ar^1 and Ar^2 to be substituted when they are aromatic heterocyclic groups. (Although the specification teaches that these

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variables may also represent substituted aromatic hydrocarbon groups, claims 1 and 8 do not explicitly recite "substituted" aromatic hydrocarbon group.)

Claims 6 and 13: Recitation of "the substituted or non-substituted alkyl group", "the substituted or non-substituted cycloalkyl group", etc. is confusing because each of these groups encompasses more than one possible substituent. For example, "the substituted or non-substituted alkyl group" does not indicate a specific alkyl group. The examiner suggests reciting --a-- instead of "the" in these phrases. It is also not clear if claims 6 and 13 are limited to embodiments in which the compound has only one group with steric hindrance. If claims 6 and 13 encompass embodiments in which the compound has more than one group with steric hindrance, it is not clear if each group with steric hindrance must be the same (or at least of the same type, e.g. each being an alkyl group).

Proper antecedent basis is lacking for "at least one of R¹ to R¹⁴" as recited in the penultimate line of claim 7. In this phrase, "R¹ to R¹⁴" should apparently read --R¹³ to R²⁶--.

Claim 13 depends from claim 1 but further limits the compound of formula [2]. Either the dependency or the formula number requires correction.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in—

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

4. Claims 1, 3 and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Shi et al. (US 6,013,383).

Shi et al. (US 6,013,383) disclose perylene compounds used as hole transporting materials and/or as light-emitting materials in organic EL devices. For example, see column 4, line 61 - c. 7, l. 10 and claims 9-24. If only one diarylamino group represented by $\text{-NAr}^1\text{Ar}^2$ is excluded from representing a group with steric hindrance as required by present claim 1, then EL devices according to Shi et al. which utilize perylene compounds containing more than one diarylamino group represented by $\text{-NAr}^1\text{Ar}^2$ (such as the prior art compounds required by patent claims 11, 13-16, 19 and 21-24) meet the limitations of present claims 1, 3 and 4 because one diarylamino group meets the limitations of “the diarylamino group” while diarylamino groups in excess of one meet the limitations of groups with steric hindrance.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3-8 and 10-13 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 11-185961.

(Note that claims 2 and 9 would be added to this rejection if claims 1 and 8 allowed Ar¹ and Ar² to represent substituted aromatic hydrocarbon groups. Claims 2 and 9 are presently interpreted as requiring a diarylamino group comprising an aromatic heterocyclic group substituted with a styryl group.)

The prior art generically discloses benzoperylene compounds encompassing compounds within the scope of the perylene compound of general formula [1] as defined in claim 1 and the benzoperylene compound of general formula [2] as defined in claim 7. For example, see the English language abstract attached to the Japanese language document and formula (1) as shown on the first page of the document. These prior art compounds are taught for use in at least one organic thin film layer of an organic EL device, and may be used alone or in a mixture.

EL devices comprising one or more of the specific benzoperylene compounds of formulae (3)-(6) as shown on pages 9-10 of the prior art are considered by the examiner to anticipate the EL device of present claims 7 and 10-12 with the expectation that the diarylamino groups of these species meet the limitations of a group with steric hindrance for suppressing aggregation of molecules. Although the list of exemplary groups with steric hindrance set forth on pages 29-31

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of the present specification does not contain diarylamino groups, it is the examiner's position that it is reasonable to expect that the diarylamino groups of these species are bulky enough to suppress aggregation of molecules because these diarylamino groups are bulkier than some of the exemplary groups set forth on pages 29-31.

With respect to claims 1, 3-6, 8 and 13, it is the examiner's position that one of ordinary skill in the art at the time of the invention, given the teachings of the prior art as a whole, could at once envisage compounds within the scope of present general formulae [1] and [2] and EL devices comprising those compounds. In particular, one of ordinary skill in the art could at once envisage EL devices comprising compounds similar to those of formulae (3)-(6) in which the aryl groups of at least one diarylamino group are non-substituted aryl groups, the compounds further comprising one or more substituents other than diarylamino groups, such as substituted or unsubstituted phenyl groups, which would inherently meet the limitations of groups with steric hindrance.

In the alternative, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds within the scope of prior art formula (1) other than those specifically disclosed, and to make compounds that are similar in structure to the species disclosed by the prior art, for use in organic EL devices. One of ordinary skill in the art would have been motivated to make other compounds similar in structure to those disclosed by the prior art with the expectation that compounds similar in structure and within the scope of the

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prior art generic formula would have similar properties and could be used for the same purpose as the prior art compounds.

7. Claims 1, 3-6 and 13 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tamano et al. (US 6,329,084 B1).

Tamano et al. generically disclose perylene compounds encompassing compounds within the scope of the perylene compound of general formula [1] as defined in claim 1 and further defined in claims 6 and 13. For example, see column 2, lines 46-64 and c. 3, l. 57 - c. 4, l. 2. These perylene compounds are for use in the light-emitting layer of an organic EL device and are used in combination with other compounds. With respect to claims 4 and 5, the examiner notes that these claims do not explicitly require the hole transporting layer (in the case of claim 4) or the electron transporting layer (in the case of claim 5) to be separate from the light-emitting layer. In a device having only a single organic layer between the anode and cathode, the organic layer will provide all the functions of light-emission, hole-transportation and electron-transportation.

Tamano's compound of formula (66) as shown in c. 53-54 is a specific perylene compound that is similar to compounds within the scope of the perylene compound of general formula [1] as defined in claim 1 and further defined in claims 6 and 13. This prior art species corresponds to a compound of present general formula [1] wherein each of R³ and R¹⁰ represents a substituted amino group, each of R⁴ and R⁹ represents a substituted aromatic hydrocarbon group, and each of R¹, R², R⁵ to R⁸, R¹¹ and R¹² represents a hydrogen atom. The substituted

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amino groups are diarylamino groups represented by $-NAr^1Ar^2$ in which each of Ar^1 and Ar^2 represents a substituted aromatic hydrocarbon group. Each of the substituted aromatic hydrocarbon groups represented by R^4 and R^9 meet the limitations of a group with steric hindrance (e.g. see p. 30, l. 6 of the present specification; the prior art substituted aromatic hydrocarbon groups are tolyl groups). Each of the diarylamino groups is similar to the at least one diarylamino group required by present claims 1, 3-6 and 13 except that the aromatic hydrocarbon groups represented by Ar^1 and Ar^2 are substituted rather than non-substituted.

It is the examiner's position that one of ordinary skill in the art at the time of the invention, given the teachings of the prior art as a whole, could at once envisage compounds within the scope of present general formula [1] and EL devices comprising those compounds. In particular, one of ordinary skill in the art could at once envisage EL devices comprising compounds similar to those of formula (66) in which the aryl groups of the diarylamino groups are non-substituted aryl groups given Tamano's teachings that each of Ar^1 and Ar^2 in prior art formula [2] may represent a non-substituted aryl group such as a non-substituted phenyl group (e.g. see c. 2, l. 56-58 and c. 3, l. 66-67).

In the alternative, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds within the scope of prior art formula [2] other than those specifically disclosed, and to make compounds that are similar in structure to the species disclosed by the prior art, for use in organic EL devices. One of ordinary skill in the art would have been motivated to make other compounds similar in structure to those disclosed by

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the prior art with the expectation that compounds similar in structure and within the scope of the prior art generic formula would have similar properties and could be used for the same purpose as the prior art compounds. For example, one of ordinary skill in the art would have reasonably expected that compounds similar to the prior art compound of formula (66) having phenyl groups in place of the methyl-substituted phenyl groups of the diarylamino groups would also make useful light-emitting materials for an organic EL device given that Tamano et al. teach that the aryl groups of the diarylamino groups may be substituted or non-substituted phenyl groups.

8. Claims 7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xie et al. (5,989,737).

(Note that claim 13 will be added to this rejection if it is amended to depend from claim 7.)

Xie et al. disclose a benzoperylene compound having two phenyl substituents for use in an organic hole injecting and transporting layer of an organic EL device. See formula (9) in column 8 of the patent. Each of the phenyl substituents meets the limitations of a group with steric hindrance (see p. 30, l. 5-6 of the present specification). The benzoperylene compound disclosed by Xie et al. is a position isomer of a benzoperylene compound of formula [2] as required by present claim 7. The "benzo" is fused at positions 2 and 3 of the perylene ring structure in the prior art compound whereas the "benzo" is fused at positions 1 and 2 of the perylene ring structure in formula [2].

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It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds similar in structure to the prior art benzoperylene compound to be used for the same purpose as the prior art benzoperylene compound with the expectation that compounds similar in structure to the prior art benzoperylene compound would have similar properties. Compounds which are position isomers are generally of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties. *In re Wilder*, 563 F.2d 457, 195 USPQ 426 (CCPA 1977).

9. Claims 1-3, 6-10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 10-88120.

The copy of the reference provided with this Office action is a machine-assisted translation.

The prior art discloses compounds for the light-emitting layer of a multilayered organic EL device. The compounds contain a condensed aryl group having 30 or less carbon atoms substituted with two disubstituted amino groups. The substituents of the disubstituted amino groups are substituted or non-substituted aryl groups or heterocyclic groups. For example, see claim 1 (bridging pages 4 and 5) and pp. 16-17. Perylene is specifically disclosed as an exemplary condensed aryl group (see p. 14). The condensed aryl group may have substituents in addition to the disubstituted amino groups. The prior art discloses numerous possibilities for these additional substituents that would inherently meet the limitation of a group with steric hindrance

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(see pp. 14-15). Disubstituted amino groups containing styryl groups are clearly considered to be within the scope of the prior art (e.g. see A-8 on page 21) although no specific example is given of an amino group containing heterocyclic groups which are further substituted with styryl groups.

The prior art does not disclose any specific examples of compounds within the scope of the present general formulae [1] or [2], but such compounds are clearly within the scope of the prior art. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds within the scope of the prior art other than those specifically disclosed, and to make compounds that are similar in structure to the species disclosed by the prior art, for use in organic EL devices. One of ordinary skill in the art would have been motivated to make compounds within the scope of the prior art generic formula other than those specifically disclosed in order to provide compounds suitable for use in the light-emitting layer of an organic EL device. One of ordinary skill in the art would have reasonably expected compounds within the scope of the prior art generic formula other than those specifically disclosed to have light-emitting properties and to be useful in organic EL devices.

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

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A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1, 3-8 and 10-13 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 6,329,083 B1. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patent claims fully encompass the subject matter of the present claims. Although the patent claims do not explicitly require at least one group with steric hindrance for suppressing aggregation of molecules, the independent patent claim recites various groups that inherently meet the limitations of a group with steric hindrance as required by the present claims. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make EL devices comprising various species of compounds within the scope of formula C3 of the patent claims with the expectation that species within the scope of formula C3 would be suitable for an EL device.

(Note that claims 2 and 9 would be added to this rejection if claims 1 and 8 allowed Ar¹ and Ar² to represent substituted aromatic hydrocarbon groups. Claims 2 and 9 are presently interpreted as requiring a diarylamino group comprising an aromatic heterocyclic group substituted with a styryl group.)

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12. Miscellaneous:

In the second line after formula [1] in claim 1, the examiner suggests changing "hydroxyl" to --hydroxy-- because, technically, the term "hydroxyl" refers to an -OH group in an inorganic compound whereas "hydroxy" refers to an -OH group in an organic compound.

The examiner suggests inserting --a-- after "has" in line 2 of claims 2 and 9.

In claim 7, "(2)" and "[2]" appear to the right of the formula. "(2)" should be deleted.

13. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax numbers for Art Unit 1774 are (703) 872-9311 for official after final faxes and (703) 872-9310 or (703) 305-5408 for all other official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (703) 872-9041.)

MRY
03/18/02



MARIE YAMNITZKY
PRIMARY EXAMINER

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